As my principal object in these researches had only been to get rid of the carbon spectrum (though in vain), I did not make any measurements of wave-length. Later on, as many laboratories were provided with powerful spectroscopic apparatus, I did not believe it to be any longer worth while to work on the subject with small instruments, hoping some other investigator would take care of it. I should be very glad if the present note would induce some spectroscopist to control and further pursue my observations. In addition, some researches with very strong sparks seem to me to be very desirable.

Berlin. KARL V. WESENDONK.

The Dust of "Blood-Rain."

I HAVE handed to Prof. Judd the specimens of "blood-rain" dust collected by me in Sicily, as mentioned in your issue of March 28. It may be remembered that the dust was collected from three tables on the terrace of the hotel, and that I brought home that from the most favourably situated table in the wet state in which it was obtained. This has since been dried and weighed, with the result that, as I expected, the density of the fall was greatest on this table, being equivalent to 9¼ tons per square mile. The average given by the other two tables was 5¼ tons per square mile.

The largest value is probably the best, but if we take the mean we shall be within the mark in saying that the density of the fall near the theatre at Taormina was about 7 tons to the square mile. ARTHUR W. RÜCKER.

A Convenient Primary Cell.

IN your "Notes" of April 18 (p. 594) you give an account of the new cell—the Cupron-element—brought out by the Accumulator Industries Company. Without intending any disparagement, will you allow me to point out that the cell, with the exception of the special form of copper oxide for which the company justly claim credit, was invented long ago by Lalande, but does not appear to be known so widely as its merits deserve. I have used the cell for a considerable time, the positive plate taking the form of a plate of copper faced on one side with granular copper oxide held in its place by a piece of copper gauze, and can corroborate the statements as to its very low resistance and great constancy. For elementary work, where resistances of a few hundredths of an ohm are to be compared and a galvanometer of negligible resistance used, I have found it most valuable. Another form of the cell, in which the copper plate is merely painted with a mixture of copper oxide powder and gum and then heated until the latter chars, is very readily set up, but has a rather greater internal resistance. Where this is desirable it may be regulated within considerable limits by making the cell a "sawdust Lalande," which has obvious advantages on other grounds. A. E. MUNBY.

Felsted.

THROUGH the kindness of the Editor I am able to reply to Mr. Munby's interesting letter. I did not intend by my note to imply that the "Cupron-element" was an entirely new combination, and indeed suggested that its chief claim to novelty lay in the construction of the copper oxide plate. The Accumulator Industries, Ltd., it is only fair to say, fully acknowledge in their circular that the cell is developed from the copper oxide element of Lalande and Chaperon. It is interesting to have Mr. Munby's testimony to the convenience of the cell, which is, I believe, used to a considerable extent on the Continent, but, as your correspondent says, is not very widely known in England.

THE WRITER OF THE NOTE.

AGRICULTURAL SEEDS.

UNDER the auspices of the Board of Agriculture a committee was appointed last summer to take into consideration the conditions under which agricultural seeds are at present sold, and to report whether any further measures can, with advantage, be taken to secure the maintenance of adequate standards of purity and germinating power.

The committee met on ten occasions and examined upwards of thirty witnesses, seed-merchants, farmers and scientific witnesses, including Mr. Carruthers, Mr. Gilchrist, Mr. Hall, Profs. T. Johnson, McAlpine and Somerville. The evidence of these witnesses is now published as a Blue-book, whilst the report of the committee is issued separately.

Taking the report first, the committee find that there is [now] no wide-spread complaint of the quality of seeds sold throughout the country. The committee, further, think that every encouragement should be given to seed-merchants to give a guarantee with the seeds they sell, and that farmers should be advised to buy only subject to such guarantee and to test the seeds they have purchased. To facilitate this the committee recommend the establishment of one central seed-testing station under Government auspices, with the aid and counsel of a small committee of experts. The report is signed by all the members of the committee. Two of their number, Sir W. T. Thiselton-Dyer and Mr. Leonard G. Sutton, while agreeing generally with the findings of the committee, raise objections to the proposal to establish a Government seed-testing station.

It is satisfactory to hear that the general quality of the seeds sold has greatly improved of late years. This improvement is, no doubt, in great measure due to the passing of the Adulteration of Seeds Act, an Act, it may be pointed out, which was promoted by the seedsmen themselves, who desired to purify their business from seed-killing, seed-dyeing and other questionable practices which had been allowed to grow up to such an extent that it was difficult for a merchant to avoid conniving at, if not practising them.

At present, so far as the large firms are concerned, there is in general no question as to the excellence of the seeds they sell, and those who, like the writer of the present notice, have had the opportunity of witnessing the care taken in selecting the seed and in afterwards cleaning it and preparing it for market will corroborate this statement. With the smaller dealers, especially in some parts of Wales and Ireland, the case seems different. There the farmers often buy relatively small quantities of seeds of low quality and equally low price from local tradesmen, ironmongers, cornfactors and the like, who have no other knowledge of seeds than such as is necessary for securing the best means of disposing of them. It is especially for the protection of small, and often ignorant, farmers that the seed-testing station is intended.

All the large firms test their own seeds and the seeds they buy from the Continent or elsewhere. Moreover, they grow them in their own trial grounds. They do this on a very much larger scale than would be possible in a seed-testing station.

Some of the smaller firms, and perhaps some of the large houses also, occasionally make use of the seed-control stations at Zurich or Halle, and they find it a grievance that they have to send to Switzerland or Germany for information which obviously could as well be obtained here. Indeed, the botanists of the Royal Agricultural Society (Mr. Carruthers) and of the Highland and Agricultural Society of Scotland (Mr. McAlpine), and perhaps others, do undertake to test seeds for the members of their several societies, or, under certain conditions, for outsiders.

These tests, wherever they be made, have reference to the "purity" of the seed, its germinating power and its "genuineness." By purity is meant freedom from seeds of weeds or other admixtures. The germinating power is tested by the percentage of seeds in any given sample which, under favourable conditions, is found to produce healthy seedlings. Theoretically a hundred per cent. should grow. In practice the percentage may, without fault of the seedsman, be, in certain cases, much below this, but it is satisfactory indeed when one thinks of the many contingencies to which the clover plant is subjected to find it to be quite common for 98 per cent. of the seed to grow. When one thinks of the humble bees, and the

mice and the cats and the vicissitudes of the climate, it seems remarkable that such a percentage of good seed should ever be obtained.

What seedsmen mean by the "genuineness" is another matter, but one of extreme importance. It would be quite impossible even for an expert to recognise seed of a particular stock or breed, say of broccoli or turnip. There are good stocks and bad "stocks" of these, but they cannot be distinguished by their seeds. A mere seed-testing station, private or official, could render no assistance in such cases. The only way to test the genuineness of a stock is to grow it and watch it throughout the season. Obviously the purchaser could not wait for that, he must trust to the good faith and reputation of the seedsman.

Considering, then, the vast scale on which seed-testing and seed-trials are now made by the leading firms and the limited scale on which seeds can be tested at a seed-testing station, and, further, bearing in mind that the ordinary seed-trials give no indication of "genuineness," we do not see that the farmer for his immediate practical purposes would be materially benefited by a seed-testing station. It would answer his purpose very much better to devote a little care to testing the seeds for himself from a sample procured some weeks before he required to sow for a crop. The seedsman, in his turn, should give a guarantee that the bulk should be equal, or closely approximate, to the sample. We say closely approximate because so numerous and so varied are the vicissitudes to which the seed is, or may be, exposed that some latitude, say to 5 or even 10 per cent., would only be reasonable.

Farmers in general sow much too thickly, so that a lower percentage than is theoretically desirable might well be condoned in practice if the seed were good of its kind.

While saying so much we are far from wishing to undervalue the importance of research-stations wherein the phenomena of germination as well as other physiological and pathological processes might be studied from the point of view of research. Associated with a small trial-ground, such stations would be very valuable for the investigation of the properties and mode of life, not only of old well-known crops, but also of new introductions. It is just here that the value of the "crank of a scientific man" would show itself. One of the witnesses objected to placing such a man at the head of a Government seed-testing station because "they get so infallible and then they take notions in their heads."

It is as well to see ourselves as others see us. We should have thought infallibility in this connection was a sign of nescience rather than of science.

MAXWELL T. MASTERS.

THE MARINE RESOURCES OF THE BRITISH WEST INDIES.

THE above is the title of a paper by Dr. J. E. Duerden, which, with a series of appendices, has lately been issued as an extra number of the *West Indian Bulletin*—the official journal of the Imperial Agricultural Department of the West Indies. As read, it formed the leading feature of a recent Congress at Barbados, held under the auspices of the aforenamed Department, at which representatives of all the West Indian Islands were present, and it sets forth in a concise and connected form the essence of all that has transpired in the utilisation for economic purposes of the rich resources of the West Indian seas. In the first part of the paper the fisheries of Jamaica, the Barbados, Bahamas, Leeward Islands, Trinidad, St. Vincent, British Guiana and Honduras are each dealt with in turn, mainly from the statistical standpoint; and then, in descending zoological order, there are treated the principal marine resources from the Mammals to the Sponges. The history of a movement of recent years to establish in the West Indies a marine biological station is next fully sketched, and its defence strengthened by a plea based on a comparison of the work achieved by institutions of the desired order existing elsewhere.

The paper shows that, in their utilisation, the marine resources of the West Indian Islands have long played a too limited part in the maintenance of the Colony itself, and that they fall short through being nowhere under the control of an organised plan. The yearly value of the fish caught is estimated at 30,000*l*., against that of fish imported at 147,000*l*., which is thus nearly five times the greater, while attention is directed to a diminution in the supply of the West Indian turtle and a decadence in more especially the "sea egg" industry, due to the effects of over-fishing and lack of scientific treatment, and, in the case of the turtle, due also to the "ceaseless capture of adults." Dr. Duerden, in discussing the remedies for these shortcomings, shows conclusively that they lie in a restocking process to be based on a practical knowledge of the life-history of the species rather than the establishment of closed seasons. Perusal of his paper shows that the importance of these two industries to the traders and inhabitants of the islands is so great that, under the present circumstances, immediate action should be instituted on their behalf.

Concerning the question of fish-capture, Dr. Duerden refers at some length to an unsuccessful attempt made in 1898 to gauge the trawling capacity of certain of the West Indian seas. He gives in full a copy of the log of the vessel employed, and in discussing the alleged failure he expresses the conviction that the venture (which was a private one) was too early suspended, and shows reason to conclude that the further introduction of northern methods without reference to tropical conditions is not likely to be successful. Claiming satisfaction for line-fishing at 200 fathoms, he is led to advocate the stake-net method lately introduced from America as specially fitted for use in bays and lagoons, if not among the coral reefs themselves. His paper shows that he has thoroughly mastered all branches of his subject, and proves beyond previous experience that the West Indian seas contain a rich fauna, which, systematically handled on scientific lines, ought materially to increase the resources of the islands, and thereby to aid in raising them from their present unsatisfactory condition.

Dr. Duerden institutes comparisons between the results obtained at the West Indies and those begotten of trained supervision and the establishment of a fisheries bureau, with its necessary plant and equipment, at the Cape and elsewhere, and he with much naïvety dwells upon the facts as calculated to affect, by competition, the Sponge industry of the Bahamas, financially the most important industry the Colony can boast. He points with justifiable emphasis to the need in the West Indies of a fisheries establishment, regarding it as a pressing necessity to enable the colonists to keep pace with the times and fully to maintain their position in competition and advancement beside the rest of the world.

Conspicuous among the marine biological establishments to which he points as exemplary, are those which have arisen in relation to the agricultural departments of localities at which they are placed; and the suggestion arises that a similar extension should be granted the Agricultural Department of the West Indies, now wholly botanical. Of the success which has attended the work in economic botany which Dr. D. Morris, the indefatigable director of this Department, has achieved in the short period which has elapsed since its foundation, our readers are aware; and we are informed by a local authority that he is eminently desirous of the extension of his sphere of influence in the direction of economic zoology. In Dr. Duerden he has at hand the one man